

What I claim is:

1. An apparatus for measuring critical parameters on equipment used in manufacturing, without evasive interruptions to said equipment.
- 5 2. The critical parameters in claim 1 include temperature, liquid and gas flow rate, distance, particles, humidity, pressure, viscosity, radiation, velocity, density, acceleration, stress/strain, pH and other more advanced chemical/material analysis techniques as described in the prior art.
3. The apparatus in claim 1 comprising capital goods having surface with attached sensors, recording device, and energy source thereon.
- 10 4. The recording device in claim 3 comprising analog to digital converters, signal conditioning devices and a means of saving the data.
5. The apparatus in claim 1 wherein said capital goods, sensors, and recording device are free from wires extending from the surface of said capital goods.
- 15 6. The means of saving the data in claim 4 wherein said data is A: transmitted digitally to an external receiver and computer, or B: stored locally on said capital goods with solid state memory, and later downloaded to said computer.
7. The energy source in claim 3 comprising a battery with efficient storage of charge at elevated temperatures up to 150C. Such batteries exhibit these properties, such as lithium metal, lithium ion, or Nickel Metal Hydride (NiHy)
- 20 8. The remote device residing on the capital goods of interest in claim 5, such that the same robotic, automated handling used to transport or direct the capital goods, is used to transport the said apparatus in claim 1.
- 25 9. The recording device and energy storage media in claim 3, and external hostile environment, with material therebetween with special isolating properties.

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10. The isolation material in claim 9, wherein said recording device and said energy storage media is protected from said hostile environment.

11. When said environmental substance to be measured is extreme heat in excess of 100C, the isolation
5 material in claim 9 is a material with low thermal conductivity, emmisivity, and convectivity.

12. The environment of claim 11, wherein said isolation material is chose from the group consisting of:
silica aerogel, carbon aerogel, silica whiskers, vermiculite, stabilized zirconia, clay, and combinations thereof.

10 13. The solid state memory of claim 6, wherein said solid state memory is chosen from the group consisting of: Electrically Erasable Read Only Memory, (EEPROM), Ferroelectric Random Access Memory (FeRAM), Magnetic Bubble Memory, Flash, Dynamic Random Access Memory, Static Random Access Memory, First In / First Out (FIFO) and Giant ManetoResistive Random Access Memory (GMR RAM).

15 14. When said environmental substance to be measured is liquid, especially those of basic or acid solutions, the isolation material in claim 9 is a material with high resistance to chemical attack, and low permeability.

15 20 16. The apparatus in claim 1 wherein said sensors, energy storage, and recording device are vacuum compatible. Alternatively, if any of the said sensors, energy storage, and recording device are not vacuum compatible, an isolation material in claim 9 is a material that hermetically seals the sensors, energy storage and/or recording device from said vacuum environment.

16. The apparatus in claim 1 wherein said sensors, energy storage, and recording device are radiation hard if said environmental substance is radiation of any wavelength that may compromise sensors, energy storage, or electronic recording devices. Alternatively, if any of the said sensors, energy storage, and recording device are not radiation hard, an isolation material in claim 9 is a material that isolates the sensors, energy storage and/or recording device from said radiation environment.
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17. The manufacturing in claim 1 include industries such as farming, mining, construction, non-electrical machinery, transportation equipment (including automobiles), food products, chemicals (including petrochemicals), electrical and electronic equipment, textiles, and utilities.

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